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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/823,280	04/12/2004	Saravuth Sirinorakul	NSE010 US	4578
34036	7590	11/04/2004	EXAMINER	
SILICON VALLEY PATENT GROUP LLP 2350 MISSION COLLEGE BOULEVARD SUITE 360 SANTA CLARA, CA 95054			MALSAWMA, LALRINFAMKIM HMAR	
			ART UNIT	PAPER NUMBER
			2825	

DATE MAILED: 11/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/823,280

Applicant(s)

SIRINORAKUL ET AL.

Examiner

Lex Malsawma

Art Unit

2825

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Apr. 12, 2004 through Aug. 18, 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input checked="" type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claims 7 and 10 are objected to because of the following informalities:

At claim 7, line 2, "heating heating" should read "heating"; and

at claim 10, line 2, "seond" should read "second".

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Song et al. (5,776,799; hereinafter, "**Song**").

Regarding claim 1:

Song discloses a method of fabricating a semiconductor chip package comprising:

providing a semiconductor wafer 120 (Fig. 5);

applying a layer of nonconductive epoxy 140 to a surface of said wafer using a screen printing process (Fig. 5 and Col. 5, lines 23-48);

sawing said wafer to create a plurality of semiconductor dice ("step 105" in Fig. 3 and Col. 4, lines 25-28); and

attaching at least one of said dice to a pad by means of said epoxy layer ("step 106" in Fig. 3; and note Col. 4, lines 34-41 in conjunction with Col. 1, lines 29-33). Therefore, this claim is anticipated.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 2-4, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Song (5,776,799) in view of Brouillette et al. (US 2002/0062556 A1; hereinafter, "**Brouillette**").

Regarding claims 2, 3, 9 and 10:

Song anticipates the method of claim 1 but **lacks** applying the epoxy layer by applying at least two epoxy sublayers. Brouillette is **cited primarily to show** that, when a polyimide film

(e.g., a nonconductive epoxy film) is formed by a screen printing process, it is a matter of design choice to form the film in either a single layer or multiple layers (note paragraph 0045). Given Brouillette, it would have been obvious to one of ordinary skill in the art to modify Song by specifically applying at least two epoxy sublayers (instead of a single layer) because Brouillette shows/teaches it is merely a matter of design choice to form a film by applying multiple layers when employing a screen printing process. *Specifically regarding claims 3 and 10:* It would have been readily obvious to one of ordinary skill in the art to hard cure a first epoxy sublayer before forming a second epoxy sublayer on the first epoxy sublayer because the second epoxy layer must have a sufficiently rigid surface on which to be applied. In order for the first epoxy sublayer to remain in a “liquid” state prior to forming the second epoxy sublayer, the screen-mask used for screen printing the first epoxy sublayer would have to remain in-place until the second epoxy sublayer is applied, otherwise one could not maintain/obtain a defined-screen-printed first epoxy sublayer upon which to form another/second screen-printed epoxy sublayer; accordingly, if the screen-mask for the first epoxy layer must remain in-place, then forming the second epoxy sublayer would be essentially useless because the second epoxy sublayer would overflow the screen-mask and edge of the wafer, i.e., a second screen-printed epoxy sublayer could not be formed without raising the first screen-mask or replacing the first screen-mask with a “thicker” second screen-mask, wherein either case, the first epoxy layer would have to be cured prior to moving the first screen-mask.

Regarding claims 4:

Song discloses the epoxy layer is partially cured into a B-stage adhesive film before bringing it into contact with a leadframe (note Col. 2, lines 54-59); accordingly, Song, modified

in view of Brouillette, would obviously result in partially curing a final epoxy layer (as currently claimed) because Song discloses that at least the portion of the epoxy layer, which will contact the leadframe, must be partially cured.

7. Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Song** (in view of **Brouillette**) as applied to claim 4 above, and further in view of **Babayan** (3,789,071) and Lin et al. (6,703,075 B1; hereinafter, "**Lin**").

Regarding claims 5 and 6:

Song (in view of Brouillette) discloses partially curing the nonconductive epoxy into a B-stage adhesive layer (note Song, Col. 2, lines 58-59); however, Song (in view of Brouillette) **lacks** providing details regarding a B-stage adhesive; accordingly, Song lacks specifically reciting that the partial curing comprises heating the epoxy layer until it is in a soft solid state. It was very well known in the art that a B-stage adhesive remains in a soft solid state and such an adhesive is commonly formed by heating at a temperature in the range of 100 °C for a time duration of at least 60 seconds. Babayan and Lin are **cited to show** the well-known process for forming/acquiring a B-stage adhesive. Babayan discloses (in Col. 5, lines 35-48) that a B-stage epoxy layer can be formed by heating in a range of about 90 °C; and Lin discloses (in Col. 3, lines 43-58) that a B-stage adhesive is formed by heating in a range of 100 °C for at least 60 seconds (i.e., for about one hour). Although Song (in view of Brouillette) does not provide specific details regarding a process for acquiring the B-stage adhesive, given Babayan and Lin, it would have been readily obvious for one of ordinary skill in the art to modify Song (in view of Brouillette) by specifically reciting process steps for acquiring the B-stage adhesive because such

process steps were very well known in the art; and Babayan and Lin show that the steps recited in the instant claims are included in the well-known process steps for acquiring a B-stage adhesive.

Regarding claim 7:

Song (in view of Brouillette) discloses the attaching step is similar to conventional processes (note Col. 4, lines 34-41); however, Song (in view of Brouillette) **lacks** specifying details for the attaching step. Both Babayan and Lin disclose that a B-stage adhesive is conventionally cured at a temperature range of about 120 °C to 175 °C (note Babayan, Col. 5, lines 43-61; and Lin, Col. 4, lines 19-24 and lines 30-34). Babayan **teaches** that the final curing time is generally “a short time” and the time could be generally adjusted according to a specific need (note Col. 5, lines 54-61). Lin **teaches** the curing time during an attaching step is accomplished in a few seconds (note Col. 4, lines 19-24). In view of the knowledge generally available with regards to curing a B-stage adhesive, as shown/taught by Babayan and Lin, it would have been obvious to one of ordinary skill in the art to modify Song (in view of Brouillette) by specifically performing the attaching step at a temperature of 110 °C to 170 °C for a time duration of 50 to 400 seconds because Babayan and Lin show/teach that such a temperature range is commonly used to cure a B-stage adhesive and curing time is generally measured in seconds and adjusted according to design needs.

8. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Song** (in view of **Brouillette, Babayan, and Lin**) as applied to claim 7 above, and further in view of Cobbley et al. (6,353,268 B1; hereinafter, “**Cobbley**”).

Regarding claim 8:

Song (in view of Brouillette, Babayan, and Lin) discloses the general conditions of the claimed invention but **lacks** pressing the die against the pad with a force in the range of 100 to 350 grams. Cobbley **teaches** that commercially available die-attaching machines include means for applying a desired pressing force if necessary, e.g., a force in a range around 100 grams (note Col. 5, lines 14-33). Cobbley generally discloses that applying a desired pressing force while attaching a die to a leadframe would depend on design requirements and if necessary, a desired force could be readily applied during an attaching step, since a conventional die-attaching machine would allow for applying the desired pressing force. Therefore, it would have been obvious to one of ordinary skill in the art to modify Song (in view of Brouillette, Babayan, and Lin) by applying a pressing force in the range of 100 to 350 grams during the attaching step because Cobbley teaches that a conventional die-attaching machine would allow one to apply such a pressing force (or any reasonably desired force) and applying such a pressing force during an attaching step would essentially depend on a particular design requirement.

Conclusion


9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.


The references listed on the attached Form PTO-892 (not specifically cited above) are cited to show methods incorporating multiple screen-printing processes, B-stage adhesives, curing processes, etc. that have similarities with process steps within the current invention.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lex Malsawma whose telephone number is 571-272-1903. The examiner can normally be reached on Mon-Fri (8 hours between 5:30AM and 8:00 PM EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lex Malsawma 
October 30, 2004


MATTHEW SMITH
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